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'Scarless reverse umbilicoplasty': A new technique of umbilical transposition in abdominoplasty

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Summary *Introduction:* The navel plays a major role in the aesthetics of the abdomen. A navel that is abnormally shaped, malpositioned or has evident scarring may compromise the outcome of an otherwise well-executed full abdominoplasty. The aim of the technique in question is to recreate a navel that looks natural, with no visible scar, and that is properly positioned.
Materials and methods: The technique was performed in 147 abdominoplasties of patients of both sexes (123 females and 24 males), with an average age of 35 years and a mean BMI of 24 kg/m^2. The procedure involves the creation of a navel of reduced size, 10 × 5 mm, and its inset in the abdominal wall. Subsequently, the as-yet-not sutured abdominal flap is extended caudally to determine the point of projection of the navel. The abdominal skin is marked, the flap is reversed and an internal suture is carried out.
Results: The appearance of the navel is aesthetically pleasant and natural looking and with no visible scarring. In addition, the position of the umbilicus is always correct. At the two-year follow-up, the results remain stable. No major complication occurred.
Conclusions: The technique allows for the attainment of an extremely natural looking navel that satisfies the aesthetic criteria of attractiveness without visible scarring. The navel is always correctly positioned, without requiring measurements during surgery.
The procedure is rapid, and although it does require a short learning curve, the results are extremely aesthetically pleasing and reproducible. The patient satisfaction rate is extremely high.

Introduction

The umbilicus is the only 'natural' scar on the human body. Although it guarantees the survival of a foetus during

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pregnancy, it has no physiological function after birth.[1] However, it plays a fundamental role in the aesthetics of the abdomen. It helps to delineate the median abdominal furrow and define lower convexity.[2] It is undeniable that the aesthetic value of the navel is greater in females than in males, for whom it has always represented a key element of beauty and sensuality. In modern society, the navel plays a central role in advertising, fashion and the entertainment industry. It is no coincidence that plastic surgeons have seen an increase in demand for umbilicoplasty, unrelated to abdominoplasty in the last few years.[3] Navels that are of an unusual shape, not well positioned or that present evident scarring are not only a source of dissatisfaction for patients but also undermine the entire success of an otherwise well-executed abdominoplasty.

Early in 1904, Bert and Viannay classified umbilicus into three main types: transverse umbilicus, round umbilicus and vertical umbilicus.[4] Thomas Stephen Cullen[5] described and illustrated, in detail, as many as 60 different forms of umbilicus, which may be assumed under normal condition.[5] There were a variety of umbilical shapes encountered in literature, including crescent, round, triangular and oval (vertical, transverse or oblique). The most common umbilical shape observed in a recent study was the round shape in both men and women, with the oval shape being the second most common.[6] Normal umbilicus has four main structures: mamelon, cicatrix, farrows and cushion.[5]

The umbilicus is usually infundibular in form and surrounded by an elevated outer margin, that is, the cushion or base, at the bottom of which is a concealed scar left after the umbilical cord stump falls off; such scar (cicatrix) may be situated in or near a shallow skin depression, which is called the furrows. The mamelon can be more or less prominent and must be regarded as the remnants of the solid lower part of the umbilical cord, which contained the umbilical arteries and urachus. Finally, when the mamelon exists, its projection from the umbilical depression forms a natural surrounding furrow, which may be more than one. Each mentioned component of the normal umbilicus may be or may not be present, thus giving rise to a large variety of intermediary forms.[5,7]

The repositioning of an umbilicus that looks natural and with reduced visible scarring is the key to success in abdominoplasty.

The aim of this technique is to recreate an umbilicus that is natural, aesthetically pleasing, well positioned and without visible scarring.

Materials and methods

In the past two years, all abdominoplasties have been performed using the following technique.

The technique was performed in 147 abdominoplasties of patients of both sexes (123 females and 24 males), with an average age of 35 years and with a mean BMI of 24 kg/m^2.

Surgical technique

With the patient in the supine position and legs bent at the knees, a standard transversal abdominal incision is made approximately 5 cm above the vulvar commissure in women and 3 cm from the base of the penis in men. The abdominal flap is lifted with electrocautery, maintaining the plane in the midline of the rectus fascia.

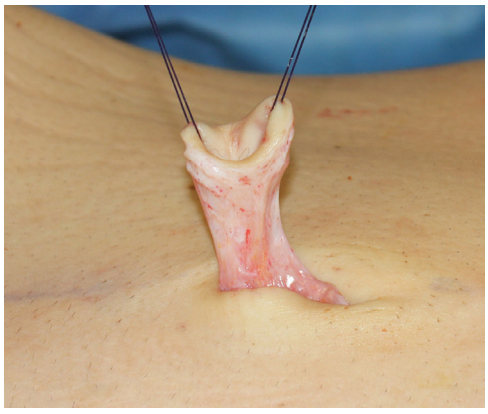

Photo 1 Umbilicus and its stalk are freed from the abdominal flap.

Once the umbilical stalk has been identified, we proceed to release the umbilicus with an oval periumbilical incision on a vertical axis measuring 20 mm x 10 mm. We place two traction sutures at the poles of the navel.

Once the umbilicus and its stalk are freed from the abdominal flap (Photo 1), we complete the lift of the abdominal flap from the rectus fascia. Rectus diastasis is treated by plicating the fascia.

Following rectus fascia plication, in case of a long stalk, the umbilicus is shortened.

Next, the umbilicus is anchored to the rectus sheath by 4 sutures using Vicryl 2-0 at 12-3-6-9 o' clock positions (Figure 1).

The stitches, which are positioned 5 mm from the dermoepidermal junction, also have the function of shortening the umbilical stalk. Once the umbilicus has been anchored, we proceed to its further reduction and reshaping. The incision once again is a vertical oval but smaller in size, i.e., 10 mm $\times$ 5 mm.

With the patient still supine, the sculpted abdominal flap is extended caudally and 'progressive tension sutures' are applied along the midline (between the abdominal flap and rectus fascia) from the xiphoid process to the navel.

In correspondence with the projection of the umbilicus on the abdominal skin, located by a traditional bimanual palpation (with one hand placed under the abdominal flap

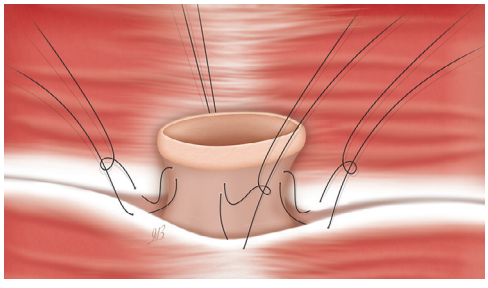

Figure 1 Umbilicus is anchored to the rectus sheath by 4 sutures using Vicryl 2-0 at 12-3-6-9 o' clock positions.

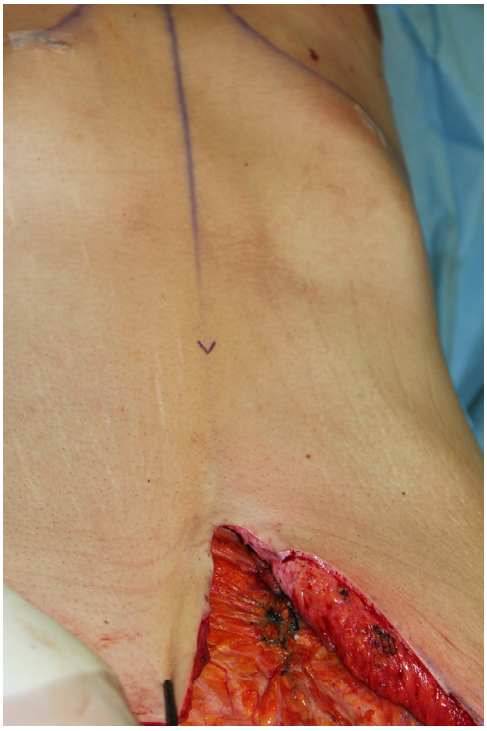

Photo 2 Picture of the umbilicus design in the abdominal skin.

and one hand above), a V-shaped incision is made with a base and at a height of 5 mm (Photo 2).

The first is only a superficial incision so that the still intact dermis can immediately be coloured with methylene blue and retain the colour; the blue colouration of the dermis will facilitate the subsequent sutures. The V-carved flap is severed at the tip at a distance of 2 mm, maintaining superior convexity.

The abdominal flap is turned over, and an area of approximately 2 cm is defatted around the V-shaped area. The dermis, which is approximately 5 mm adjacent to the V-shaped area, is then exposed.

The navel is initially anchored to the abdominal flap through two sutures positioned at 1 o' clock and 11 o' clock positions of the navel. The sutures are Vicryl 2-0 and include the fascia, the umbilical skin and the abdominal skin at the corners of the base of the V, with internally facing knots (Figure 2(A)-(C)).

The inset proceeds with two continuous Vicryl 2-0 sutures that meet at 6 o' clock from 1 o' clock (suture B) and 11 o' clock (suture A) positions. Each of the continuous sutures (A and B) must be repeated 3 times, which include the fascia, umbilical skin and abdominal skin (Figure 3(A)-(F)). A and B sutures, after passing through the umbilicus stalk, are tied together in the plicated rectus sheath (Figure 4(A) and (B)).

Once the umbilicus is inset and the patient placed in a semi-seated position, the excess of abdominal skin flap is excised.

At the end of the procedure, the umbilicus is medicated, simply using a swab of saline-impregnated gauze.

Results

The umbilicus was positioned normally in all of the patients operated on. Over the following weeks, the tension of the adjacent skin tends to make the umbilicus assume normal dimensions. The aesthetic result is the pleasing and natural appearance, and scarring is practically imperceptible. At 2-year follow-up, the results remained stable.

It should be noted that during the post-operative period, de-epithelisation of the navel may occur. This condition occurred in 20% of cases and yet is spontaneously resolved over the course of the first 2-3 weeks. We never had any complications resulting from infection. In 12 out of 147 patients, partial dehiscence of the suture occurred. These were resolved with secondary healing without visible scars. In one case, we had complete dehiscence, requiring immediate surgery.

Discussion

The navel plays a fundamental role in the aesthetics of the abdomen. It can be circular or oval with a diameter of up to 2 cm. Generally, it is not very deep and is oriented vertically in young individuals. It tends to become deeper and more transverse with age and weight gain because of the increase

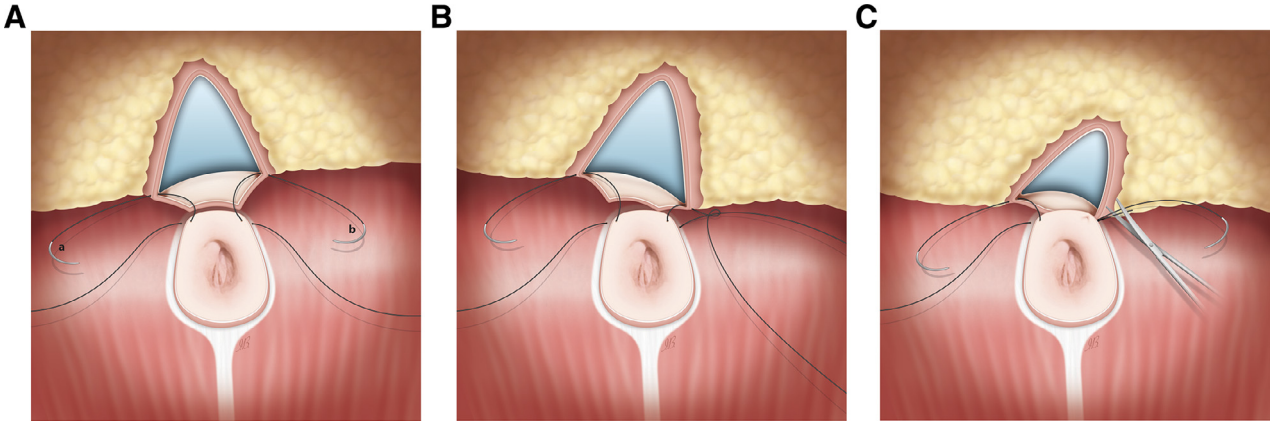

Figure 2 (A)-(C): The navel is initially anchored to the abdominal flap through two suture positions at 1 o' clock and 11 o' clock positions of the navel.

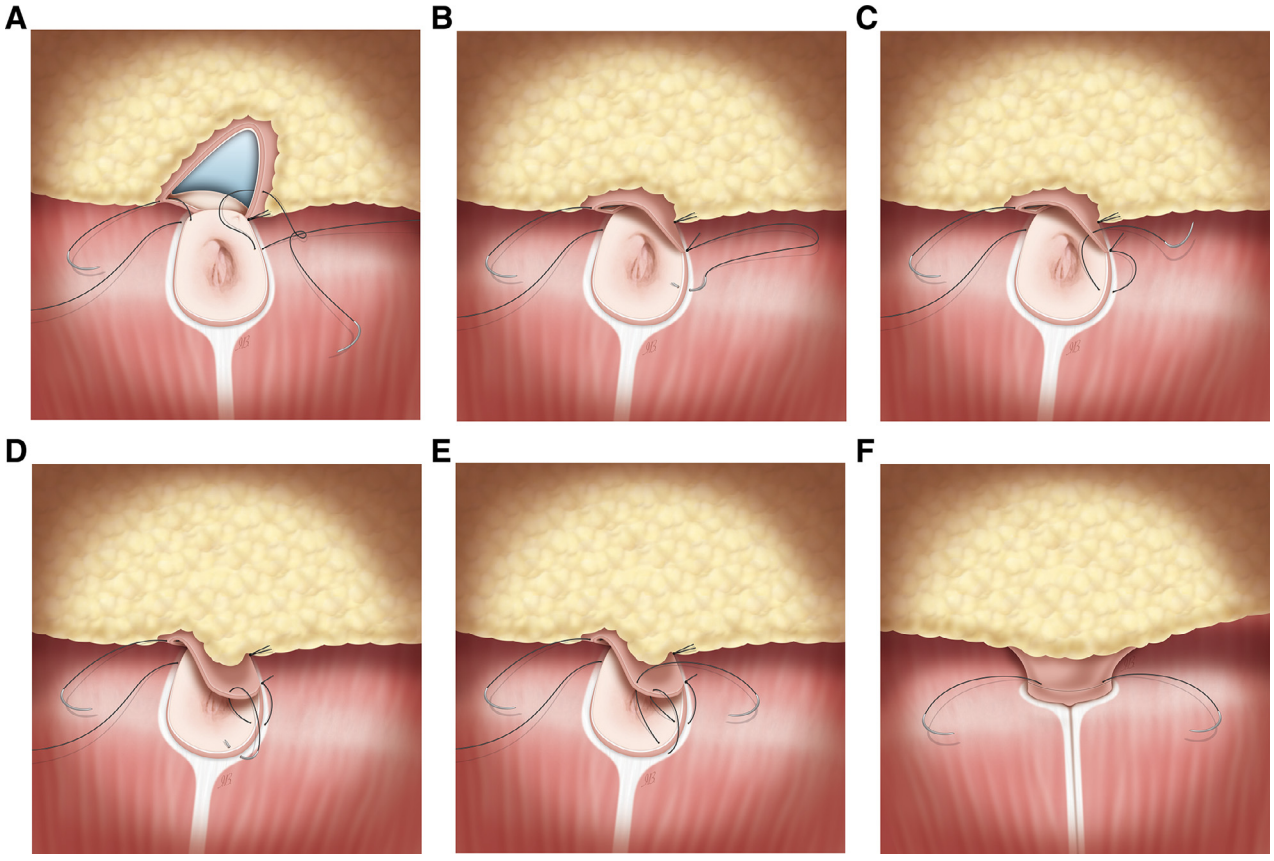

Figure 3 (A)–(F): The inset of the navel proceeds with two continuous Vicryl 2–0 sutures that meet at 6' o clock from 1 o' clock (suture B) and 11 o' clock (suture A) positions.

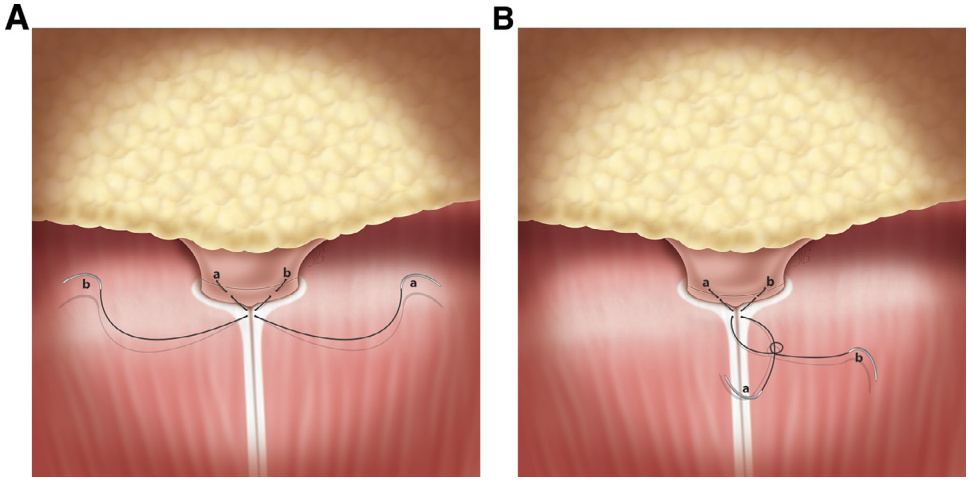

Figure 4 (A) and (B): A and B sutures, after passing through the umbilicus stalk, are tied together in the plicated rectus sheath.

in the surrounding area of subcutaneous adipose tissue and following pregnancy.

Some subjects have a protruding navel. Overly large navels with an excessive depression and very small navels are considered to be unattractive, as are protruding navels. Navels that are considered to be aesthetically pleasing are moderately small and oval with moderate depression and superior hooding.[2,8]

In 1975, Baroudi described that a normal navel resembled a round, depressed scar and measured 1.5–2 cm in diameter.[9] In 1978, Dubou and Ousterhout[2] reported their measurements of umbilical size from 100 nonobese patients (no BMI reported). Of the 100 subjects, 36 were men and 64 were women, with an age range of 18–69 years. The mean ± SD height and width of the umbilicus were 2.1 ± 0.6 cm and 2.3 ± 0.7 cm, respectively. The umbilicus was located at a mean ± SD of -0.7 ± 1.3 cm in relation to the iliac crest (crest at zero).[6,10]

The umbilicus is located more inferiorly in men than in women, and on average, the distance to the iliac crests is

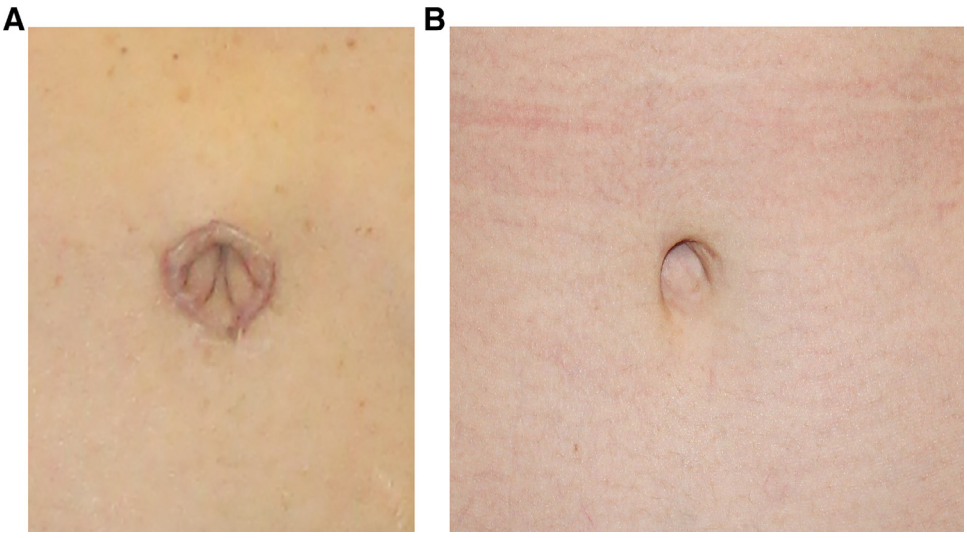

Photo 3 (A): Poor result after classic technique of umbilicoplasty. (B): Result after scarless reverse umbilicoplasty.

shorter in women than in men, the latter of which is likely related to differing body types by sex, specifically the wider hips in women than in men.[6]

The T- or vertically shaped umbilicus with superior hooding consistently scored the highest in aesthetic appeal.[11]

The ideal umbilicus should have a natural contour, prominent depth, minimal additional scars and proper superior hooding. Shinohara et al. emphasised that an umbilicus with a natural appearance consists of a ring, a tubular wall, a sulcus and a bottom, without any excess skin that would interfere with the aesthetic aspect of the umbilicus.[12]

In addition, Lee et al. suggested that an aesthetically optimal female umbilicus must possess the following properties: a vertical ratio of 46:54 (with regard to the xiphoid process and the lower limit of the vulvar cleft), a midline horizontal position and an oval shape with no hooding or superior hooding.[13]

Awareness of the shape and size of the ideal navel are indispensable elements for the transposition of the umbilicus during abdominoplasty.

Our technique allows for the aesthetic criteria of a beautiful navel to be met. The vertically oblong shape is given by the incision. Our navel is depressed because of the anchoring to the aponeurosis and the defatting of the undersurface of the abdominal flap. The goal of this technique is the absolute invisibility of the suture, which is located along the navel circumference, internally, in the plane of contact between the dermis and the fascia. The deep suture guarantees that following the resorption of the Vicryl sutures, no visible sign remains on the skin (Photo 3(B)).

Despite the reduced size of the V-shaped incision of the abdominal flap, this tends to increase in size during the post-operative phase due to the tension of the adjacent skin and to assume the optimal size and a vertical orientation. Long incisions lead to excessively vertical, large navels with visible scars. Regarding the location of the inset, the umbilicus is located on the median line, although, according to the study by Rohrich, not perfectly centred.[14] It is situated above the iliac crest at a distance from the pubic symphysis of approximately 15 cm.[1,3,10,15] Unlike other techniques in which the surgeon has to decide where to inset the navel, relying on various intraoperative measurements (15 cm from the pubic symphysis, 3 cm above the iliac crests),[1] in our technique, no such measurements are performed.

The umbilicus is inset within the fascia in its original position and sutured to the abdominal flap exactly in correspondence of its projection. The abdominal flap is moderately stretched caudally with the patient supine with no degree of trunk flexion on the pelvis. This eliminates any tension on the suture. The method is extremely anatomical; it does not lead to secondary deformity associated with tension. The complete exposure of the surgical field allows for an accurate, effective and undoubtedly rapid and simple execution.

Conclusions

Our technique allows for the attainment of a navel that appears natural, meets the aesthetic canons of attractiveness and has no visible scars. The navel is always positioned correctly, without the need for intraoperative measurements. The procedure is rapid, and it requires a short learning curve, and the results are very pleasing and always repeatable. The creation of an umbilicus using this technique exalts, to the highest degree, the results of well-executed abdominoplasty. The patient satisfaction rate is extremely high. No major complication has ever occurred.

Conflict of interest

None.

Funding

None.

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